



Standard 1

Number Sense and Computation

CORE STANDARD**Number Sense and Computation****Multiplication and Division of Whole Numbers**

Understand and use standard algorithms for multiplication and division of whole numbers.

[Standard Indicator: 5.1.5]

Comparing Fractions and Decimals

Compare fractions and decimals.

[Standard Indicators: 5.1.1, 5.1.2]

Addition and Subtraction of Fractions and Decimals

Understand and perform addition and subtraction with fractions, including fractions with different denominators and mixed numbers. Add and subtract decimals, including money in decimal notation.

[Standard Indicator: 5.1.6]

- 5.1.1 Count, read, write, compare and plot on a number line decimals to thousandths using words, models and expanded form.
Example: Write the number 198.536 in words.
- 5.1.2 Compare and order fractions and decimals to thousandths by using the symbols for less than ($<$), equal to ($=$) and greater than ($>$).
Example: Write from the least to the greatest using the correct symbols: 0.5, 0.26, 1.2 and 0.008.
- 5.1.3 Identify and explain prime and composite numbers.
Example: List the first five prime counting numbers. Tell why they are prime numbers.
- 5.1.4 Use words, models, standard form and expanded form to represent place value of decimal numbers to thousandths.
Example: Explain how you know that 0.005 is less than 0.050.
- 5.1.5 Solve problems involving multiplication and division of whole numbers fluently using a standard algorithmic approach and explain how to treat the remainders in division.
Example: Twenty-six students are going on a field study using the school vans. How many vans are needed if each van holds six students and a driver?



5.1.6 Solve problems using a standard algorithmic approach involving addition and subtraction of:

- decimals, including money;
- fractions, including fractions with different denominators; and
- mixed numbers.

Examples:

- How much money will you have coming home if you go to the store with \$3.00 and you buy popcorn for \$0.95 and a drink for \$1.25?
- The cheer squad has $2\frac{1}{4}$ yards of blue fabric, but they need 5 yards to make all the banners wanted for the game. How much fabric is still needed?

5.1.7 Solve problems involving the multiplication of fractions using a standard algorithmic approach. Explain the relationship of the product relative to the factors.

Example: After the party there is $\frac{1}{2}$ of a pizza left. If you give $\frac{1}{3}$ of the leftover pizza to your brother, how much of the whole pizza will he get? Explain why the product is smaller than the factors.

5.1.8 Construct and analyze line graphs and double-bar graphs from data, including data collected through observations, surveys and experiments.

Example: Complete a line graph to show the changes in temperature over a month.

5.1.9 Perform simple experiments to gather data from a large number of trials and use data from experiments to predict the chance of future outcomes.

Example: Using a three-color spinner with red, yellow and blue:

- Tally the result for 10 spins and then for 30 spins.
- Combine your results with your class and compare results.
- Describe what happens as the number of trials increases.
- Can you determine on which color the next spin will land?
- Can you tell the likelihood that the next spin will land on yellow?



Standard 2

Algebra and Functions

CORE STANDARD

Algebra and Functions

Variables

Evaluate simple algebraic expressions.

[Standard Indicator: 5.2.1]

Coordinate Grids

Use two-dimensional coordinate grids to represent points in the first quadrant that fit linear equations and then draw the line determined by the points.

[Standard Indicator: 5.2.2]

5

5.2.1 Write and evaluate simple algebraic expressions.

Example: Write the equation to represent how many cookies you originally had if you put three cookies in each of five bags and you had two extra. What is the value if there are four cookies in each bag, and you still had two extra?

5.2.2 Use two-dimensional coordinate grids to represent points in the first quadrant that fit linear equations and then draw the line determined by the points.

Example: Plot the points $(3, 1)$, $(6, 2)$ and $(9, 3)$. Connect the points and describe what you notice.



Geometry and Measurement

CORE STANDARD

Geometry and Measurement

Polygons

Measure angles; describe angles in degrees; and identify, classify and draw polygons and triangles.

[Standard Indicators: 5.3.1, 5.3.2]

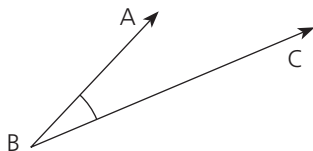
Shapes and Solids

Find and use the perimeter and area of triangles, parallelograms and trapezoids, and the surface area and volume of rectangular prisms.

[Standard Indicators: 5.3.5, 5.3.6]

5.3.1 Measure angles and describe angles in degrees.

Example: Measure the following angle.



5.3.2 Identify, classify and draw polygons and triangles (i.e., equilateral, isosceles, scalene, right, acute and obtuse triangles).

Examples:

- Draw as many different types of quadrilaterals as possible.
- Draw an isosceles right triangle.

5.3.3 Describe the attributes (such as number of edges, vertices and number of faces) of solids, including cubes, pyramids and cylinders.

Example: Complete the following table.

Solid	Faces	Edges	Vertices
cube	6	12	8
square pyramid		8	5
cylinder	3	0	0
rectangular prism			

5.3.4 Identify and describe, using words and pictures, the following transformations: reflections, rotations and translations. Use this knowledge to design and analyze simple tilings and tessellations.

Example: Using tiles or grid paper create a design that does not have any gaps or holes.



- 5.3.5 Develop and use the formulas for the perimeter and area of triangles, parallelograms and trapezoids using appropriate units for measures. Find the area of complex shapes by dividing them into basic shapes.

Example: You want to carpet a square room whose sides are 17 feet. You are not going to carpet the area near the fireplace that is 6 feet long and 4 feet wide. What is the area to be carpeted?

- 5.3.6 Develop and use the formulas for the surface area and volume of rectangular prisms using appropriate units for measures.

Example: Find the surface area and volume of a rectangular box with a length of 30 cm, width of 15 cm and a height of 10 cm.

PROCESS STANDARDS

Indiana's Academic Standards for Mathematics describe the key content of each grade level and course, and students must develop conceptual understanding of this content. The American Diploma Project noted that, "beyond acquiring procedural mathematical skills with their clear methods and boundaries, students need to master the more subjective skills of reading, interpreting, representing and 'mathematicizing' a problem" (p. 55).

The National Council of Teachers of Mathematics has described five Process Standards that "highlight ways of acquiring and using content knowledge" (p. 29). The following Process Standards must be addressed throughout the learning and teaching of Indiana's Academic Standards for Mathematics in all grade levels in mathematics.

Problem Solving

- Build new mathematical knowledge through problem solving.
- Solve problems that arise in mathematics and in other contexts.
- Apply and adapt a variety of appropriate strategies to solve problems.
- Monitor and reflect on the process of mathematical problem solving.

Reasoning and Proof

- Recognize reasoning and proof as fundamental aspects of mathematics.
- Make and investigate mathematical conjectures.
- Develop and evaluate mathematical arguments and proofs.
- Select and use various types of reasoning and methods of proof.

Communication

- Organize and consolidate mathematical thinking through communication.
- Communicate mathematical thinking coherently and clearly to peers, teachers and others.
- Analyze and evaluate the mathematical thinking and strategies of others.
- Use the language of mathematics to express mathematical ideas precisely.



Connections

- Recognize and use connections among mathematical ideas.
- Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
- Recognize and apply mathematics in contexts outside of mathematics.

Representation

- Create and use representations to organize, record and communicate mathematical ideas.
- Select, apply and translate among mathematical representations to solve problems.
- Use representations to model and interpret physical, social and mathematical phenomena.

In addition, estimation, mental computation and technology are areas that need to be addressed at all grade levels in mathematics.

Estimation and Mental Computation

- Know and apply appropriate methods for estimating the results of computations.
- Round numbers to a specified place value.
- Use estimation to decide whether answers are reasonable.
- Decide when estimation is an appropriate strategy for solving a problem.
- Determine appropriate accuracy and precision of measurements in problem situations.
- Use properties of numbers and operations to perform mental computation.
- Recognize when the numbers involved in a computation allow for a mental computation strategy.

Technology

- Technology should be used as a tool in mathematics education to support and extend the mathematics curriculum.
- Technology can contribute to concept development, simulation, representation, communication and problem solving.
- The challenge is to ensure that technology supports, but is not a substitute for, the development of skills with basic operations, quantitative reasoning and problem-solving skills.
 - Elementary students should learn how to perform thoroughly the basic arithmetic operations independent of the use of a calculator.
 - The focus must be on learning mathematics and using technology as a tool rather than as an end unto itself.

References

American Diploma Project (2004). *Ready or Not: Creating a High School Diploma that Counts*. Washington, D.C.: Achieve, Inc.

National Council of Teachers of Mathematics (2000). *Principles and Standards for School Mathematics*. Reston VA: author.